

CE-7

## **IMPLEMENTATION OF JIGSAW MODEL WITH LESSON-STUDY-BASED ON STRATEGY AND METHOD OF CHEMISTRY INSTRUCTION SUBJECT (SMPK).**

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### **Abstract**

This research is aimed to increase the interactive activity and concept mastery of the students of chemistry education study program on Strategy and Method of Chemistry Instruction Subject through jigsaw model with lesson-study-based. Lesson study activity with steps plan, do and see was conducted at Chemistry Department of Mathematics and Science Faculty, State University of Makassar with 7 involved observers. Methods used in this research is learning cycle (plan, do, and see) and collaborated with several SMPK lecturer through collegiality principle and mutual learning. Present research was done on odd semester academic year 2012/2013 with four cycles. The research subject is students of chemistry education study program, received year 2010/2011.

Keywords: jigsaw, lesson study, instructional strategy and method

### **Introduction**

Creation of effective and pleasant learning condition is very crucial on order to emerge and develop variety of competences of students. The development of student's competence include cognitive, affective, and psycomotoric competence is the main goal of a learning process. Based on that, the application and elaboration of learning steps, strategy or learning type should be afforded, either in direct instruction, investigation-based learning, or cooperative-collaborative learning.

One learning types that has been known, applied, and developed is cooperative learning type jigsaw. This learning type required a fixed unique planning type. As example, times that used to organize specific skills required, the teacher can mapping how to make transition from class instruction to small groups instruction can run well (Arends, 2007)

This learning type counted as learning type that implement team appreciation, individual responsibility, and equal chance to success. According to Nur (2005) jigsaw could be used if the subject course in written narrative form and the learning goal emphasize to concept in descriptive material than skills. Continuously, Nur (2005) also explained that in jigsaw, especially jigsaw II, the student work in heterogeneous team. The students asked to learn a chapter or another subject to read and was given "expert sheet" that contain different topics to each team members, so when reading section began, students from different team with same topic met in an expert team to discuss their topic for 30 minutes. The experts then back to their initial groups and then teach their topic to the teammate alternately. In the end, the students give some quiz about all the topics and the score of that quiz become team score. The winner team could be appreciated with a prize or certificate. Using this way, the students are expected to be motivate to learn. Giving present technique can improving the student behavior to respond the tasks given and maximally the mean of present that they get.

This learning type can develop several abilities and competences, for example high

thinking order competence and pedagogical competence that can affect to professional competence or mastery of subject concepts. The last competence is very important to the prospective teacher as well as the professional teacher. The concept mastery is the ability to understand and apply the lesson content in every occasion or condition where that concept required. This ability can be trained through a knowledge activities and learning skills, for example lesson study activity. Lesson study is learning activities studies collaboratively and sustainable based on collegiality principle and mutual learning to build learning community (Susilo, 2009). On lesson study implementation the teacher collaboratively: 1) studying the curriculum, formulating the learning objectives and student development objectives (life-skills development); 2) planning the learning to gaining the objectives; 3) performing and observing the research lesson; and 5) taking reflection to discuss the lesson investigated and improved on the next lesson planning (Susilo, 2009).

Relative with the aim to attaining the learning condition that effective to develop the professional competence or the concept mastery of educational students, in this occasion, we are the lesson study team carry out a learning research by implementing the steps of lesson study (plan, do, and see) to the lecture subject Strategy and Method of Chemistry Instruction (SMPK). This purposed to increase the knowledge and pedagogic competence to the chemistry teacher candidate. Besides that, this research also aimed to introduce the steps of cooperative learning type jigsaw. This lesson type include in simple cooperative learning, because the student only discuss and solve the problem given by teacher in the classroom.

All this time, lecture of SMPK subject was held by two lecturers, where the lecturer divide the lecture course for 16 times lecture process. So, each lecture get 8 times lecturing process include the evaluation. This method absolutely has a limitation, such as variation of information being lack because the lecturing course or discussion topics only from one lecturer. This method also not a solid team because the team working partially, so the learning until reflection to improve learning quality process not maximally transpired.

Based on that reason, SMPK lecturing through lesson study with open class implementation (watched and observed by observer from another study program) very important for continuous teaching profession development effort, so the professionalism and concept mastery of students continuously increased.

The SMPK subject that that become research object through lesson study learning is method and type of cooperative learning. So, this activity teach cooperative learning through cooperative learning method that sets in learning cycle of lesson study (plan, do and see)

Present research aimed to improve the concept mastery of educational student through the application of cooperative learning type jigsaw on the lecture course Strategy and Method of Chemistry Instruction (SMPK). This research was done by several SMPK lecture collaboratively (with collegiality and mutual learning principle).

This activity expected to be useful for: 1) the lecturer, to give information about implementation of lesson study, the importance of team collaboration to furnish and correct the lack of each other, so the learning quality will improve; and 2) to the head of faculty, this activity can be a media to evaluate the success of lecturing process, especially in the achievement of standard competence and basic competence of SMPK subject.

### **Research Methods**

Present research is a lesson study research which apply cooperative learning type jigsaw on the SMPK lecture. The research subject is 43 students of chemistry study program, Mathematics and Science Faculty, State University of Makassar received year 2010/2013. This research done in 4 cycles (plan, do and see activity).

The learning devices used this research were RPP, LKPD, Strategy of Chemistry Instruction textbook, and student's book for grade X, XI, and XII. The instruments used is observation sheets and SMPK concept mastery tests.

The steps of lesson study elaborated below:

1<sup>st</sup> cycle:

**Plan step:**

Lesson study team meet and planned the implementation of lesson study on SMPK lecture at Chemistry Major. This meeting was headed by the team leader and discuss: 1) implementation time “plan” and “do” activity for the first meeting; 2) selection of lecturer as model for first, second, third, and fifth “do” activity; 3) selection of observer for first, second, third, and fifth meeting.

**Do step:**

The first “do” activity was performed by lecturer model who implement jigsaw learning model. Basic competence is the students should be able to understand and communicate various types of cooperative learning (KD-1). Methods which execute to gaining that competence is applying cooperative learning type jigsaw and preparing the learning devices, Models and Strategy of Science Instruction books, and student’s chemistry book for grade X, XI, XII that borrowed from Chemistry Library FMIPA UNM. The lecturing process watched by observer to observe the student activity and involvement in lecturing process. The observer expected to give any advice in the “see” activity for improvement of next “do” activity. The steps of jigsaw learning model showed in Table 1.

Table 1. The steps of jigsaw learning model.

Learning Steps	Learning Activity	Substances Required
Dividing the students into several teams	Divided the students into heterogeneous teams with has 5-6 members	
Dividing the students into expert team	Divided the students into expert team randomly from a team	
Reading	The students get the expert topics and asked to read the information related with the topics	Expert sheets (in this case, LKPD), literature (example: Strategi Belajar Mengajar Kimia by Arifin, M et.al. 2005), and student’s chemistry book for grade X, XI, and XII (example: Chemistry Book for SMA/MA by Rachmawaty and Johari, 2007).
Team reports	The expert back to their initial group and then teach the other group member about their mastery topic	
Presentation and discussion	Each expert team presented their discussion results	The discussion summary of the expert group
Test	Individual test about all topics give to each students.	Quiz sheet for each students
Team recognition	The team score calculated and prepared certificate or another present to the winner team	Criteria appreciation sheets

Sources: Slavin (2005).

**See steps and plan for 2<sup>nd</sup> cycle**

The implementation of first “see” and plan for second cycle execute after the implementation of first “do” to evaluate and reflect the result of “do” activity. First chance given to the students to extend their opinion about lesson study implementation, and the next the observer to present their observation result and give suggestion for second “do” improvement.

**2<sup>nd</sup> cycle****Do step**

The “do” step activity was performed by lecturer model. The basic competence is the students should be able to identify the suitability of cooperative learning characteristic with chemistry concept in Senior High School.

**See step and plan for 3<sup>rd</sup> cycle**

The implementation of the second “see” activity and third “plan” executed after the implementation of second “do” to evaluate and reflect the second “do” activity. The first chance given to observer from inter-chemistry-major to elaborated their observation and give any advice to improvement of the third “do”. Continuously, the second chance given to lesson study team from chemistry study program.

**3<sup>rd</sup> Cycle****Do step**

The third “do” activity was performed by model lecturer. The basic competence is the students should be able to communicate various methods of chemistry instructional methods (KD-1 for main course of Methods of Chemistry Instruction)

**Third see step and fourth plan**

The implementation of third “see” and fourth “plan” executed after the implementation of third “do” activity. The first chance given to observer from inter-chemistry-major to elaborated their observation and give any advice to improvement of the fourth “do”. Continuously, the second chance given to lesson study team from chemistry study program.

**4<sup>th</sup> Cycle****Do step**

The fourth “do” step was performed by lecturer model. The basic competence is the student should be able to identify the suitability of the learning model characteristic with certain chemistry concept (KD-2 for main course of Methods of Chemistry Instruction)

**See step**

On the fourth “see”, four lesson study team member decided to finish the lesson study observation activity on SMPK course, odd semester, academic year 2012/2013 at Chemistry Major FMIPA UNM.

**Results and Discussion****1. Students activity during learning process**

The activity of students during learning process was observed by observers. The observation results each lesson study cycles were explained below:

**1<sup>st</sup> cycle****Plan step:**

The meeting results is one lecturer agreed as lecturer model and 7 as observer. From this meeting also agreed that the first “plan” was executed by lecturer team of SMPK course.

The implementation of first “plan” concerted the lecturing activity of types of cooperative learning concepts. Substance discussed was lecturing strategic used, media used, time allocation, and other learning devices that support the course, the course content, and conclusion

expected after the lecturing process. Agreement reached was the implementation of cooperative type jigsaw as lecturing strategy with LCD projector and white board as media. To support the lecturing process, lesson study team compromised to prepare learning source like handbook and LKPD sheet about type and methods of learning based on strategy that will implemented to the students.

Do Step:

The first “do” step by lecturer model applied jigsaw method. The steps of jigsaw method have been showed in Table 1.

See step and second plan for 2<sup>nd</sup> cycle:

Generally, the observer commented that the learning process have been actively engage the students to find information and increasing the student’s competence on concept mastery which expected. Even there are student from a study group irresponsible to the lesson. This is out of lecturer model attention during the class. Students have a notion that the implementation of lesson study coerce the students to fostering better learning based on the students and lecture content characteristic and make the students understand the subject matter deeply. For second “do” improvement, the suggestions of observers are to pay attention on whole student involvement and admonish the unwanted activity of students, such as if there are students that seems like look for information in their PC/ Laptop whereas they look for another things.

As lecturer model, observer’s advice will follow-up, implement, and perfect for second “do” with basic competence (KD-2) to identify the suitability of types of cooperative learning with certain concept or content in chemistry at same class.

2<sup>nd</sup> cycle

Do step:

Steps that carried out to gaining the competence was the application of cooperative learning type jigsaw by lecturer model and then prepared the learning devices, Models and Strategy of Science Instruction books, and student’s chemistry book for grade X,XI. And XII which borrowed from Chemistry Library, FMIPA UNM. The learning process was observed by observer team to view the active involvement of students during the learning process. After second “do” executed, lesson study team made second “see” activity to obtain information and suggestion of second “do” results.

See step and third plan for 3<sup>rd</sup> cycle

Generally, the observer commented that the learning process have been run well. The class activity have been engaged the student to constructed their knowledge and professional skills through literature reviewing, discussion, presentation, and sharing between presenter team and another teams. Nevertheless, there are member of presenter team that not get opportunity to give comment and answer to another team’s question, because times up, and lecturer model instructed to finish the learning. For the improvement of third “do” observes advised to adjust time allocated with discussion topics range or the next course content. The lesson study team, especially lecturer model followed up the observer’s suggestion to arrange the third plan with pay attention to suitability of time allocated with next discussion topics (third “do”)

3<sup>rd</sup> cycle

Do step:

Steps that carried out to gaining the competence was the application of cooperative learning type jigsaw by lecturer model and then prepared the learning devices, Models and Strategy of Science Instruction books, and student’s chemistry book for grade X,XI. And XII

which borrowed from Chemistry Library, FMIPA UNM. The learning process was observed by observer team to view the active involvement of students during the learning process. After third “do” executed, lesson study team made third “see” activity to obtain information and suggestion of third “do” results.

#### Third see and fourth plan

In general, either the observer from chemistry study program or from outside stated that the learning process run interactively and high level RPP (Lesson plan) achievement. The process engage the students actively to construct their knowledge and professional skills through literature study, discussion, presentation and sharing between presenter team and the other teams. Nevertheless, there are students that cheat each other during the evaluation (quiz), because they are still sitting position (in circle) not arranged to normal position yet, so they have chance to share the answer during the test. For forth do improvement, the observer suggest to pay attention with student’s sit arrangement during evaluation or another test like quiz and the other. The lesson study team, especially lecturer model followed up the observer’s suggestion to arrange the fourth “plan” and perform fourth “do”.

#### 4<sup>th</sup> cycle

##### Do step:

Steps that carried out to gaining the competence was the application of cooperative learning type jigsaw by lecturer model and then prepared the learning devices, Models and Strategy of Science Instruction books, student’s chemistry book for grade X,XI. And XII which borrowed from Chemistry Library, FMIPA UNM also followed the observer suggestion on third “see”. The learning process was observed by observer team to view the active involvement of students during the learning process. After third “do” executed, lesson study team made fourth “see” activity to obtain information and suggestion of third “do” results.

##### See step:

On the “see” step. All four lesson study teams and observer stated that the learning process run very interactive and evaluation process run orderly. On the fourth “see”, lesson study teams agree to finish to lesson study observation on SMPK course, odd semester, and academic year 2012/2013 at Chemistry Major FMIPA UNM.

## 2. Concept mastery

Concept mastery data as the student’s learning achievement on SMPK course shown in Table 2.

Table 2. Concept mastery data from 1<sup>st</sup> cycle to 4<sup>th</sup> cycle (plan, do, see)

Score / cycle	1 <sup>st</sup> cycle	2 <sup>nd</sup> cycle	3 <sup>rd</sup> cycle	4 <sup>th</sup> cycle
Average score	72	78	82	87
The lowest score	65	71	72	75
The highest score	77	80	85	90

Based on that concept mastery data as the student achievement in table 2 shown that there are average score from 1<sup>st</sup> to 4<sup>th</sup> cycle increased. This indicated that the implementation of cooperative learning type jigsaw with lesson-study-based can increased student’s concept mastery on SMPK course.

## Conclusion

The implementation of lesson study gave positive contribution for students and lecture involved, such as:

1. Improve the interactive activity of educational students on SMPK course.
2. Increase the concept mastery especially for types of cooperative learning and instructional methods subject.
3. Produce the lesson plan that able to teach students effectively and awaking student's participation on learning process
4. Inculcate the understanding which the observation focus not on how the lecturer teach, but to the student's learning activity.

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